


INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P06294PC00	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE 03/00564	International filing date (day/month/year) 08.04.2003	Priority date (day/month/year) 10.04.2002
International Patent Classification (IPC) or both national classification and IPC H04Q7/38		
Applicant Telefonaktiebolaget LM Ericsson (publ)		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 6 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
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**INTERNATIONAL PRELIMINARY
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International application No. PCT/SE 03/00564

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1, 2, 4-9 as published
3, 3a filed with telefax on 02.04.2004

Claims, Numbers

1-20 filed with telefax on 02.04.2004

Drawings, Sheets

1/2-2/2 as published

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-20
	No: Claims	
Inventive step (IS)	Yes: Claims	1-20
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations

see separate sheet

Concerning Point V

- 1) The following documents are cited:
D1: 3GPP TS 25.305 V5.4.0 (2002-03)
D2: EP-A2-1056304
D3: US-A1-002094817
- 2) Independent claim 1 relates to a method (in a mobile telecommunication network) for providing positioning information for a mobile terminal located within a cell, the cell being identifiable by means of a cell Geographic Area Information (GAI).

This is generally known from D1 which document is cited in the description and forms the closest pre-published art. Both D1 and the introductory part of the description contain a discussion of the various types of positioning using cell-IDs, Observed Time Difference Of Arrival or Assisted GPS methods. The problem is that the latter two are more complex to implement and the former is not always accurate enough.

The current application thus aims to improve the accuracy of cell-ID based positioning, especially in situations where the mobile station has roamed from an RNC which controls the connection to another RNC which provides the actual network resources.

This is overcome (cf characterizing features of claim 1) by introducing the concept of a "Cell Portion GAI" rather than merely a cell GAI as is known in the art (eg D1). This Cell Portion GAI is associated with a cell portion (ie a part of a cell rather than the whole of a cell), which is identifiable by the identification of the (single) antenna beam covering this cell portion by using a phase reference provided by a pilot channel or by a downlink dedicated physical channel comprising dedicated pilots. This Cell Portion GAI is transmitted from the RNC controlling the resources of the base station to the mobile station to the RNC that controls the actual connection.

This is neither known nor derivable from the prior art, and allows a more accurate but still simple method of locating a mobile terminal. Claim 1 thus meets the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and

industrially applicability.

- 3) Independent claims 9 and 10 relate to computer program products essentially for carrying out the method of claim 1 (or any claim dependent thereupon).

Independent claim 11 relates to the corresponding resource controlling RNC.

Independent claim 12 relates to the corresponding connection controlling RNC.

Independent claim 20 relates to a mobile telecommunication network comprising the RNC of claim 11 and the RNC of claim 12 for carrying out the method of claim 1 (or any of the claims dependent on any of the above independent claims).

Similar comments to the above apply also to these claims which thus also meet the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and industrially applicability.

- 4) Owing to their dependencies on the above independent claims, dependent claims 2 - 8 and 13 - 19 also meet the requirements of Articles 33(1) - (4) PCT with regard to novelty, inventive step and industrially applicability.

- 5) For the sake of completeness, the following is noted:

- i) It is not clear that the requirements of conciseness (Article 6 PCT) are best met with two independent claims (9 and 10) for a computer program product.

Moreover, it is noted that these claims merely claim that the program product is "loadable into the internal memory of a computer" or "stored on a computer", rather than claiming that the program is actually running on a computer. This may be of relevance for patentability in some jurisdictions.

- ii) Certain published documents (Rule 70.10 PCT):

The above mentioned document D3 (with publication date 18.07.02) does not constitute prior art within the meaning of Rule 64.1(b) PCT. It seems that the claims of the current application are novel over the teachings of this document (see in particular page 4 sections 0037 and 0038 disclosing the transmission between an SRNC and a DRNC via an Iur interface of data

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including cell GAI information), essentially for the reasons set out above with respect to D1.

No check has been made as to whether the priority of this prior application has been validly claimed.

- iii) There would appear to be a number of editorial errors in claim 1. For example in the second line, "EL" should presumably be "a". Moreover, it would seem that in the characterizing part of claims 1, "the Cell Portion GAI" should read "a cell portion GAI". Some explanation as to what this Cell Portion GAI is would also increase the readability of claims 1, 11 and 12.
- iv) Claim 20 should have been drafted in the one part form (cf claims 9 and 10). The reason for this is that in the characterizing part of a claim belong only features that are not known from the art. However, the characterizing part of claim 20 includes all features of claims 1 to 8 and 11 - 19. However, claims 1, 11 and 12 are in the two part form. It is thus to be presumed that the items in the pre-characterizing parts of these claims are known (eg from D1). This leads to uncertainty and thus unclarity as to the relationship between the invention and the prior art. This contravenes the requirements of Rule 6.3(b) PCT and Article 6 PCT.

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as physical units control different parts of the network. One unit is e.g. responsible for the control of a communication connection while another unit is responsible for the control of the resources that said communication connections use. This will now be illustrated by means of figure 1. The figure 1 shows a part of a UMTS Terrestrial Radio Access Network (UTRAN) 10, which can serve as an example of a distributed network as described above. Radio Network Controllers (RNC) 102a, 102b perform the control of communication connections and network resources respectively of the base stations 104a-104d and are responsible to provide connections to the Core Network 100. The RNCs 102a, 102b are connected to Node-B:s 104a-104d, wherein one Node-B comprises one or more radio base stations 106. Each base station 106 controls the UEs within its covered cell area. Due to the above-mentioned distinction, the RNC can have various roles: Regarding network resources, the RNC 102b acts as a controlling RNC (C-RNC) that is responsible for the control of resources of a part of said network including a number of cells, each of which serving a plurality of UEs 108. Regarding the communication connections, an RNC 102a, 102b acts as the serving RNC (S-RNC) for those connections that terminates in that RNC. However, when a UE 108 moves during an ongoing session from a first RNC 102a, which is the S-RNC for the corresponding communication connection, to a neighbouring RNC 102b, the original RNC 102a still remains the S-RNC for this connection while the second RNC 102b, which is in control of the resources that this connection uses, is a drift RNC (D-RNC) that supports the S-RNC 102a with the necessary radio resources; however, without any influence on said connection. Thus, the D-RNC controls at least one cell that is used in a radio connection controlled by a serving RNC and supplies the S-RNC with resources.

(Insert page 3a)

Thus, it is a problem, as previously described, that positioning information, that only is based on the cell-ID, is not accurate enough and may hence imply disadvantages for services where a more exact location of the UEs is required.

Another problem is that a S-RNC cannot get sufficient positioning information of a UE that has roamed during an ongoing session to a D-RNC, which provides network resources for said UE, while the S-RNC still controls the connection of said UE.

3a

3GPP TS 25.305 V5.4.0 (2002-03) is a functional specification of User Equipment positioning in UTRAN. The specification mentions that the Iur interface may be used for carrying positioning information, but it does not specify what type of information that may be or neither how it may be performed.

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CLAIMS

1. Method in a mobile telecommunication network (10) for providing a first
5 radio network controlling unit (102a) with positioning information for EL
mobile terminal (22) located within a cell (20) and served by a radio base
station (21) covering said cell (20), the cell is identifiable by means of a cell
Geographical Area Information, GAI, the method is **characterised in** that it
comprises the step of: -transmitting the Cell Portion GAI, which is associated
10 with the cell portion (23) being a portion of the cell wherein the mobile
terminal (22) is located, from a second radio network controlling unit (102b)
that controls the resources of said radio base station (21) to the first radio
network controlling unit (102a) that controls the connection of said radio
base station (21) to the mobile station (22), wherein the cell portion (23) is
15 covered by one antenna beam transmitted from said radio base station (21),
whereby the cell portion (23) is identifiable by identification of the antenna
beam and each antenna beam covering a respective cell portion (23) is
distinguished by means of a phase reference provided by a pilot channel or
by a downlink dedicated physical channel comprising dedicated pilots.
20
2. The method according to claim 1, wherein the pilot channel is the
Secondary Common Pilot Channel (S-CPICH).
3. The method according to any of claims 1-2, wherein the cell portion (23)
25 covered by the antenna beam is determined by location points describing the
geographical coordinates of said antenna beam.
4. The method according to claim 1, wherein the cell portion (23) consists of
an area that extends from the Radio Base Station (21) to the cell border
30 within a detected angle of arrival of signals from the mobile terminal.
5. The method according to any of claims 1-4, wherein the mobile
telecommunication network (10) is a UMTS network and the first radio
network controlling unit (102a) is a first Radio Network Controller, RNC, and
35 the second radio network controlling unit (102b) is a second Radio Network
Controller, RNC.

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6. The method according to claim 5, wherein the first RNC (102a) is a serving RNC and the second RNC (102b) is a drift RNC.

7. The method according to claim 6, wherein the drift RNC transmits the Cell Portion GAI to the serving RNC over the Iur interface.

8. The method according to claim 7, wherein the Cell Portion GAI is an information element of the RNSAP-protocol.

9. A computer program product directly loadable into the internal memory of a computer within a radio network controlling unit, comprising the software code portions for performing the steps of any of claims 1-8.

10. A computer program product stored on a computer usable medium, comprising readable program for causing a computer, within a radio network controlling unit, to control an execution of the steps of any of the claims 1-8.

11. A resource controlling radio network controlling unit (102b) in a mobile telecommunication network (10) adapted to provide a connection controlling radio network controlling unit (102a) with positioning information for a mobile terminal (22) located within a cell (20) and served by a radio base station (21) covering said cell (20), whereby the cell is identifiable by means of a cell Geographical Area Information, GAI, characterised in that it comprises means for associating the cell portion (23) being a portion of the cell wherein the mobile terminal (22) is located with a Cell Portion GAI, and means for transmitting said Cell Portion GAI to the connection controlling radio network controlling unit (102a) that controls the connection of said radio base station (21) to the mobile station (22), wherein the cell portion (23) is covered by one antenna beam transmitted from said radio base station (21), whereby the cell portion (23) is identifiable by identification of the antenna beam and each antenna beam covering a respective cell portion (23) is distinguished by means of a phase reference provided by a pilot channel or by a downlink dedicated physical channel comprising dedicated pilots.

12. A connection controlling radio network controlling unit (102a) in a mobile

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telecommunication network (10) that controls the connection between a mobile terminal (22), located within a cell (20), and a radio base station (21), covering said cell (20), is characterised in that it comprises means for receiving a Cell Portion GAI associated with the cell portion (23) being a
5 portion of the cell wherein the mobile terminal (22) is located wherein the cell portion (23) is covered by one antenna beam transmitted from said radio base station (21), whereby the cell portion (23) is identifiable by identification of the antenna beam and each antenna beam covering a respective cell portion (23) is distinguished by means of a phase reference
10 provided by a pilot channel or by a downlink dedicated physical channel comprising dedicated pilots.

13. The connection controlling radio network controlling unit (102a) or the resource controlling radio network controlling unit (102b) according to claim
15 12, wherein the pilot channel is the Secondary Common Pilot Channel (SC-PICH).

14. The connection controlling radio network controlling unit (102a) or the resource controlling radio network controlling unit (102b) according to any of
20 claims 12-13, wherein the cell portion (23) covered by the antenna beam is determined by location points describing the geographical coordinates of said antenna beam.

15. The connection controlling radio network controlling unit (102a)
25 according to claim 12 or the resource controlling radio network controlling unit (102b) according to claim 11, wherein the cell portion (23) consists of an area that extends from the Radio Base Station (21) to the cell border within a detected angle of arrival of signals from the mobile terminal.

30 16. The connection controlling radio network controlling unit (102a) according to any of claims 12-15 or the resource controlling radio network controlling unit (102b) according to any of claims 11, 13-15, wherein the mobile telecommunication network (10) is a UMTS network and the connection controlling radio network controlling unit (102a) is a connection
35 controlling Radio Network Controller, RNC, and the resource controlling

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radio network controlling unit (102b) is a resource controlling Radio Network Controller, RNC..

17. The connection controlling radio network controlling unit (102a) or the
5 resource controlling radio network controlling unit (102b) according to claim
16, wherein the connection controlling RNC (102a) is a serving RNC and the
resource controlling RNC (102b) is a drift RNC.

18. The connection controlling radio network controlling unit (102a) or the
10 resource controlling radio network controlling unit (102b) according to claim
17, wherein the drift RNC comprises means for transmitting the Cell Portion
GAI to the serving RNC over the Iur interface.

19. The connection controlling radio network controlling unit (102a) or the
15 resource controlling radio network controlling unit (102b) according to claim
18, wherein the Cell Portion GAI is an information element of the RNSAP-
protocol.

20. A mobile telecommunication network **characterised in** that it comprises
20 a resource controlling radio network controlling unit (102b) in accordance
with any of claims 11, 13-19 and a connection controlling radio network
controlling unit (102a) in accordance with any of claims 12-19 for performing
the steps in accordance with any of claims 1-8.

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